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TITLE: Military Health Behaviors: Promotion of Healthy Weight  
and Fitness in Career Personnel

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## **Introduction**

The primary purpose of this study is to reduce the proportion of Soldiers at Ft. Bragg who fail to meet Army requirements for body fat defined by AR 600-9, the Army Weight Control Program (AWCP), and fitness standards defined by FM 21-20, Physical Fitness Training, Army Physical Fitness Test (APFT). The study has been designed to: 1) be a non-clinical, population-based intervention for military personnel, 2) analyze data that the military routinely collects during APFT and height/weight testing (AWCP) for purposes other than this research, 3) meet the standards of "no greater than minimal risk" research, and 4) be conducted with anonymity of participants.

To reduce the proportion of Soldiers who fail to meet body fat (AWCP) and fitness (APFT) standards, an environmental/internet-based intervention will be provided to Soldiers at Ft. Bragg. The Military Services Fitness Database (MSFD) was slated to be provided to Ft. Bragg to measure the effectiveness of the environmental/internet-based intervention. Recent developments have caused this application to be significantly modified to fit into Ft. Bragg's current information system infrastructure. The original plans to install the current version of the MSFD at Ft. Bragg have become implausible for reasons outside of this researcher's control. Therefore an alternative plan of action has been developed and initiated without any detrimental effects on scheduling. These developments will be addressed in further sections.

It is hypothesized that over the two years of intervention, the percentage of Soldiers who fail to meet body fat and fitness standards will decrease significantly at Ft. Bragg. The development of both the MSFD and the environmental/internet-based intervention occurred in close collaboration with the military, particularly USARIEM and Womack Army Medical Center.

## **Body**

### **Military Services Fitness Database (MSFD) and Data Collection**

The MSFD is an electronic database that records and stores body weight/body fat and APFT results of military personnel. The MSFD was developed to meet the requirements of Department of Defense Instruction 1308.3, namely, a standardized method for the collection and storage of APFT and body weight/fat results. Data for this population-based study are derived from the military's standard operating procedures for the collection of APFT data. Soldiers are required to take the APFT semi-annually. These data are collected for purposes other than this study, but these data will be analyzed to determine if a nonclinical, environmental/internet-based intervention reduces the proportion of Soldiers who fail to meet fat and fitness standards established by the U.S. Army.

Pilot testing of the MSFD has been conducted, and the MSFD was modified to incorporate the requests and suggestions of military personnel. The military leadership at the Pentagon and Ft. Bragg viewed the MSFD favorably. MG Adair and COL (P) Flowers, G1, Pentagon, were briefed on the MSFD. A Memo of Support for implementation of the MSFD for collection of AWCP and APFT data at Ft. Bragg is awaiting was signed by MG Adair May 2004. Preliminary data presented in a later section were collected utilizing the MSFD.

In a new development, the Pennington Biomedical Research Center (PBRC) research team, USARIEM, and the G6, XVIII Airborne Corps have formed a partnership with FusionNet, which is being developed by the XVIII Airborne Corps Knowledge Management Office. FusionNet is a computer application that is being developed to streamline data collection and storage in the military. Source-code from the MSFD was provided for inclusion in the FusionNet application to capture AWCP and APFT data and generate reports. Data collected

with FusionNet will be provided to PBRC at scheduled intervals for statistical analysis to determine the efficacy of the H.E.A.L.T.H. web application. The researchers will use these data to determine if the environmental/internet-based intervention reduces the proportion of Soldiers who fail to meet AWCP and APFT standards.

The fielding of FusionNet has been delayed due to the Global War on Terror. A backup plan has been implemented to collect PT Cards (DA Form 705) from units within the 82<sup>nd</sup> Airborne Corps. The data from the PT cards will be entered by PBRC personnel on site at Ft. Bragg. Methodology has been established to ensure that data entered from PT cards can be longitudinally joined with data to be collected by FusionNet.

#### Environmental/Internet-Based Intervention

The intervention, consisting of an environmental component and an internet (website) component, is designed to promote healthy nutrition and physical fitness to every Soldier at Ft. Bragg. The intervention provides users with a safe and effective means to manage body weight, through use of established resources and a website called H.E.A.L.T.H. (Healthy Eating, Activity, and Lifestyle Training Headquarters), which provides credible information on nutrition, physical fitness, and weight management. Due to the non-clinical, population-based design of this study, Soldiers are not formally "recruited" for the study. Nor does this study require a time commitment from Soldiers, although the Soldiers may voluntarily dedicate time to obtaining information from the H.E.A.L.T.H. website or reading health information that is made easily accessible as part of this study.

The environmental component, or health promotion program was developed in close consultation with representatives from the US Army Center for Health Promotion and Preventive Medicine (USACHPPM), Aberdeen Proving Ground, MD and representatives from the Nutrition

Care Division, Womack Army Medical Center Public Affairs Office, and Information Services Office, Ft. Bragg, NC. The aim of the environmental aspect of the intervention is to use existing military resources to promote healthy eating and exercise and to promote use of the H.E.A.L.T.H. website. The PBRC research team and military representatives from USACHPPM and Ft. Bragg agreed to utilize the following methods to foster an environment that promotes healthy behavior:

- 1) The Public Affairs Office will assist with regular dissemination of health promotion messages in a variety of media formats.
- 2) Womack Army Medical Center will provide opportunities to educate physicians and nurses to promote healthy eating, regular exercise, and use of the H.E.A.L.T.H. website, which will include written handouts, flyers, and other media that promote the website.
- 3) Preventive Medicine and Nutrition Care Division will coordinate their activities to routinely promote healthy eating and exercise and to draw attention to the H.E.A.L.T.H. website.
- 4) Information Services will work with the research team to coordinate dissemination of healthy messages via the internet.

The internet component of the intervention consists of the H.E.A.L.T.H. website. Support for an internet component has been found among Soldiers. A recent survey of 520 Soldiers at Ft. Bragg who are on the Army Weight Control Program found that 32.7% of Soldiers identified the internet as a weight loss strategy that they think might be helpful (G. Bathalon, personal communication, May 10, 2004). In addition, an internet component to weight loss interventions is consistent with the Institute of Medicine report on weight management in the military, which

suggests the development and testing of internet interventions in the context of existing models used by the military (IOM, 2003).

The H.E.A.L.T.H. website was specifically designed to aid military personnel in achieving healthy nutrition, physical fitness, and healthy management of body weight, as well as being physically prepared for combat. Soldiers at Ft. Bragg can use the website to obtain general health information, as well as general information on nutrition, fitness, and maintenance of a healthy lifestyle, or they can create an "account" that allows them to use the website interactively to track their progress and develop a more personalized diet and exercise plan unique to their individual needs and goals. Use of the website is completely anonymous (the PBRC researchers cannot identify an individual user of the website), regardless of whether or not a user creates an account.

The architecture of the website contains three primary sections of information, focused on the following topics: 1) general health education, 2) weight gain prevention and weight maintenance, and 3) weight loss through healthy nutrition and exercise prescriptions. Section 1 provides users with credible general health information, particularly regarding health topics relevant to military personnel. Section 2 is designed to increase Soldiers' awareness of the importance of maintaining a healthy weight, and emphasizes weight maintenance at a healthy weight according to military standards. The goal of this section is to prevent inappropriate weight gain (obesity prevention). Section 3 is designed to assist Soldiers who do not meet military standards for weight and/or body fat in losing weight. This section provides tools to determine the amount by which the Soldier exceeds his/her screening weight-for-height, estimates the number of calories necessary to lose weight at a healthy and safe rate (1-2 lbs. per week), and develops a personalized weight management program.

Sections 2 and 3 operate through a combination of personal choice and guided assistance. Rather than leaving Soldiers to develop their own weight loss strategy, the H.E.A.L.T.H. website guides the user through a step-by-step process, designed by health and weight loss experts, but is uniquely developed to meet military needs. Soldiers begin by entering their measurements into the "Recommended Weight Calculator," which informs the individual of their current weight as it relates to military standards, maximum recommended weight in order to stay within military recommendations, as well as calories needed to maintain current weight or lose weight. Soldiers may also choose to measure whether their body fat falls within Army standards, via a similar calculator. Based on these results, Soldiers are directed to the weight maintenance (Section 2) or weight loss (Section 3) programs. After proceeding to the appropriate program, Soldiers receive a general explanation of the concept of energy balance, followed by a more explicit explanation as to the key components of successful weight management (Section 2) or weight loss (Section 3): diet, exercise, and lifestyle modification. Soldiers are then guided through each of these components in a step-by-step manner, beginning with nutrition/diet planning.

The "Diet Plan" page introduces Soldiers to a customized strategy for planning meals, based on 1 to 2 pounds per week weight loss (or based on current weight maintenance, if appropriate.) The "Diet Plan" page also provides Soldiers with links to helpful tools in the effort to prepare and adhere to meal plans: the Daily Food Planner (allows the user to plan meals that fit within daily caloric goals, or allows the user to enter the foods eaten in a given day to see how actual caloric intake compares with recommended intake), and a printable food log sheet.

After Soldiers select a customized meal planning strategy (based on food, meal replacements, or MREs or any combination of these, and 1 vs. 2 pound per week weight loss), they have access to the "Menu Flipbooks." The "Menu Flipbooks" contain a variety of meals

(including breakfast, lunch, dinner and a snack) each of which has been pre-calculated to contain the numbers of calories required to enable the user to achieve the total daily caloric intake necessary for weight maintenance (Section 2) or weight loss (Section 3). For example, based on aforementioned calculations of calories needed to maintain the Soldier's current weight, a Soldier who has selected a food-based meal plan for weight loss at a rate of 2 pounds per week might be told that he or she should limit him or herself to a 1200 calorie diet. That Soldier would be provided with a menu flipbook customized to meet those needs. The flipbook would offer a variety of options for breakfast meals averaging around 300 calories, lunch and dinner options averaging around 350 calories each, and a snack that averages around 200 calories, for a daily caloric intake of about 1200 calories. Users are able to "flip" to different selections of foods for each meal if they prefer a selection other than what is initially provided in the plan and the calorie content is preserved by the program supplying other choices with the same caloric content and food group. Serving sizes, as well as vegetarian options, are provided. The goal of this tool is to make it as easy as possible for Soldiers to plan daily menus that permit them to adhere to the caloric intake level suggested by the "Recommended Weight Calculator." These flipbook plans also include suggestions for meal replacements in order to replace meals with shakes and snack bars if that is more convenient or desirable for the Soldier. MREs (Meals Ready-to-eat) have been included in the flipbooks as well. Therefore, the user can use the tools on the website to plan for periods of field training exercise or deployment, during which time it is equally important to monitor caloric intake.

Soldiers are then guided to the exercise component of the site. The "Personalized Planner" page provides general information about the importance of physical activity, along with the link to a customized "Strength and Cardiovascular Training" workout plan. The

“Personalized Planner” page also offers links to tools such as the “Physical Activity Calculator,” which assists Soldiers in determining how many calories they have burned while engaged in a particular physical activity (ranging from conventional exercises to daily life activities) and the “Monitor Your Exercise” page, which provides users with helpful explanations and motivational information regarding some of the common barriers to physical activity.

The customized “Strength and Cardiovascular Training” workout plan begins by asking users to enter information that is used to assess their current fitness level and needs. Once the assessment is complete, the user is provided with a personalized workout plan based on the information he or she has entered. These exercise prescriptions are based on the American College of Sports Medicine (ACSM) guidelines (ACSM, 2000). These recommendations are accompanied by a statement of caution indicating that if a user has individual limitations or health issues, they should consult their doctor prior to use of the exercise program. This plan is shown in a month long format and specific exercises are shown for each body area (e.g. arms, legs) each day. Photos and instructions for each exercise are provided and can be printed out on a daily basis. The user can adjust this to accommodate their personal schedule, as allowed by the program (e.g. options to switch days or change exercises etc.) within the guidelines of the (ACSM, 2000). Thus, it is programmed in a way that should keep the user on a reasonable schedule of exercise for his/her personal needs and goals. In the future, when the user returns to the site, he or she will be prompted to revisit the initial assessment page, to re-evaluate his or her fitness level and needs, and provide updated workout plans according to fitness needs at any point in time.

The final component of Sections 2 and 3 relates to lifestyle modification. The health experts guiding the development of the H.E.A.L.T.H. website recognize that behavioral/lifestyle

change is the most effective method of achieving long-term weight goals. The "Lifestyle Modification" page offers a series of modules, on topics such as exercise/food monitoring and behavioral contracting. Soldiers are encouraged to complete one lesson each week, while adhering to their customized diet and exercise plans. The lifestyle modification modules will assist Soldiers in identifying and discontinuing unhealthy eating and exercise habits. The information provided in these lessons will also enable them to take a more global approach to setting and attaining realistic and healthy weight goals, as opposed to one-time and potentially unhealthy, "quick fixes" and short-term goals. Thus, this information, combined with the guidance and interactive tools on the site, will aid Soldiers in being healthy throughout the year, hopefully increasing the likelihood that Soldiers will be more combat ready at a moments notice. This aspect is of particular interest given the rate of current deployment.

Soldiers may also create a personalized account on the website to track their progress over time. In this sense, the individual's information is present anytime they log in for their use. Information that individuals may want tracked over time is weight, fitness progress, as well as tracking meal planning and exercise prescriptions over time. Interactive tools available allow the user to retrieve their "personal profile" to obtain information needed to aid them in their improved health plan. However, PBRC researchers cannot identify Soldiers based on information they enter into the website. The use of the website and any information provided to the web for personalized feedback is completely anonymous.

The website is compatible with the Army Weight Control Program (AWCP). Military personnel who fail to meet performance standards and/or body weight/fat standards are placed on the AWCP for remediation. The AWCP provides nutritional counseling and promotes a weight loss of 3 to 8 pounds per month or a loss of 1% body fat per month. Soldiers enrolled in the

AWCP at Ft. Bragg will be encouraged to utilize the website as a tool to aid them in reaching their goals. Satisfaction with the website will be evaluated anonymously when users voluntarily complete the online satisfaction survey, located in Appendix B. Appendix D contains a number of examples of screen captures from the website, which have been significantly modified in the past year.

### **Key Research Accomplishments**

- Developed the research team by recruiting and hiring the following new employees:
  - Carolyn Brinkley, MBA – program coordinator; hired to replace the outgoing program coordinator
  - Chris Goff, B.S. – physical fitness/exercise consultant, certified personal trainer by the American Council on Exercise (ACE)
- Robin Barnes, retired 1SG, was hired to replace the outgoing communications specialist, Elizabeth Mitchell. Ms. Barnes will be on-site at Ft. Bragg to promote healthy eating and exercise and coordinate publicity activities for promotion of the H.E.A.L.T.H. website. Ms. Barnes will work closely with the above entities to ensure the effective and timely placement of publicity materials on post.
- Assisted with installation of the MSFD for pilot testing at selected sites on post at Ft. Bragg.
- Entered final stages of pilot testing of the MSFD. The MSFD has been pilot tested with A and B Companies, Womack Army Medical Center (WAMC), Ft. Bragg, NC. Data was collected for October 2003, April 2004, October 2004, and April 2005 APFTs. Statistical analysis of this data has demonstrated the MSFD's ability to collect and store useful

APFT data. Preliminary data collected utilizing the MSFD is presented in the next section.

- Finalized collaboration with FusionNet administrators and designed a process for collaboration. It should be noted that the collaboration with FusionNet has confirmed the utility of the MSFD as a stand-alone application, as well as its ability to serve as a prototype to be integrated into existing computer applications and delivered across the Army. A number of meetings were held with information technology personnel (G6, XVIII Airborne Corps) at Ft. Bragg to discuss the use of FusionNet to provide APFT/AWCP data from XVIII Airborne Corps. (Meetings are detailed in Appendix E.)
- Developed data collection procedures for collection of baseline data, as FusionNet is not expected to be fielded until mid-2006.
- Conducted statistical analyses on data collected during pilot testing of MSFD during A Company, and B Company for October 2003, April 2004, October 2004, and April 2005 APFT tests. To conduct this pilot testing, the PBRC research team worked closely with USARIEM investigators and representatives from USACHPPM and WAMC.
- Discussed inclusion of MSFD in Personal Information System (PIMS) being developed by Womack IMD with Mr. Dean Spice. Code from the MSFD will be incorporated in a future release of PIMS.
- Traveled to Ft. Bragg to meet with military personnel involved in pilot testing of MSFD, oversee pilot testing of the MSFD, discuss technical support requirements and software installation issues, and solicit feedback on the MSFD and the H.E.A.L.T.H. website (see Appendix E for detailed travel summary).

- Continued programming and content development for H.E.A.L.T.H. website. Further refined nutritional and physical activity components of the website based on feedback from beta testing. (See Appendix D for examples of updated programming.)
- Conducted beta testing of the H.E.A.L.T.H. website at various sites including PBRC and Nutrition Care Division of the Womack Army Medical Center.
- Began modifying the H.E.A.L.T.H. website for pilot testing with the Weigh to Stay program of the Nutrition Care Division of the Womack Army Medical Center. This entailed close coordination with Nutrition Care Division personnel in order to tailor the site to meet Weigh to Stay and AWCP objectives.
- Attended Army Weight Control Program sessions at the Nutrition Care Division of the Womack Army Medical Center, and established collaboration with the Nutrition Care Division for pilot testing of the H.E.A.L.T.H. website.
- Solicited informal feedback on the H.E.A.L.T.H. website from discussion groups organized on post at Ft. Bragg by Dr. Mitchell, as well as from Nutrition Care Division staff at Womack Army Medical Center.
- Solicited feedback on publicity materials designed to promote use of the H.E.A.L.T.H. website and made revisions accordingly
- Updated list of contact organizations for dissemination of publicity materials and continued to develop relationships
- Received approval by HSRRB and PBRC IRB for study protocol (July 2004).
- Yearly continuing review report approved by PBRC IRB May 2005 and submitted to HSRRB.

- Submitted abstract for paper presentation on the MSFD for 2005 NAASO (The North American Association for the Study of Obesity) conference.

### **Reportable Outcomes**

Pilot testing of the MSFD yielded preliminary data from A and B Companies, Womack Army Medical Center (WAMC), Ft. Bragg, NC. This pilot testing covered multiple iterations of the APFT (October 2003 or "Time 1," April 2004 or "Time 2," October 2004 or "Time 3," and April 2005 or "Time 4").

A total of 1182 Soldiers' records were recorded by the MSFD. Of this number, 160 Soldiers' data were collected for all 4 time points (called "completers"), indicating a substantial attrition rate. The longitudinal data for the completer set were evaluated to assess change in body weight and fatness over the testing period.

It was observed that the weight and BMI scores showed similar trends for both the completers and the non-completers. However, the completers tended to be slightly thinner than the non-completers, although this was not a statistically significant difference.

Data for the completers were available for a 2-year period of time, which allowed for an investigation of a seasonal effect, i.e. that weight gain or loss may follow seasonal patterns. These data showed no clearcut seasonal effect.

The data showed periodic trends towards weight gain for both male and female Soldiers. Figures 1 and 2 show weight trends for male completers and non-completers over two years, while figures 3 and 4 show weight trends for female completers and non-completers.

Fig. 1: Male weight change (lbs.) over 2 yrs.

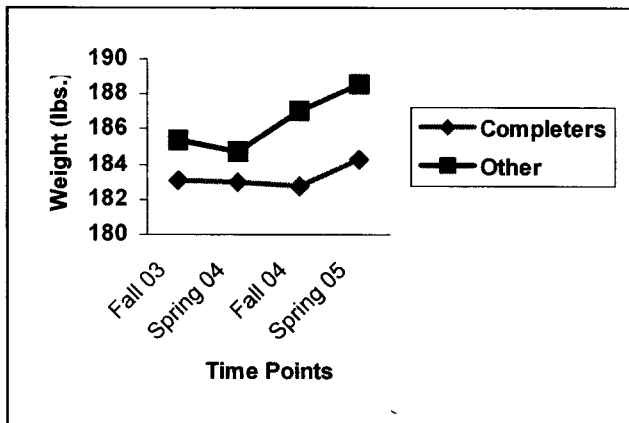
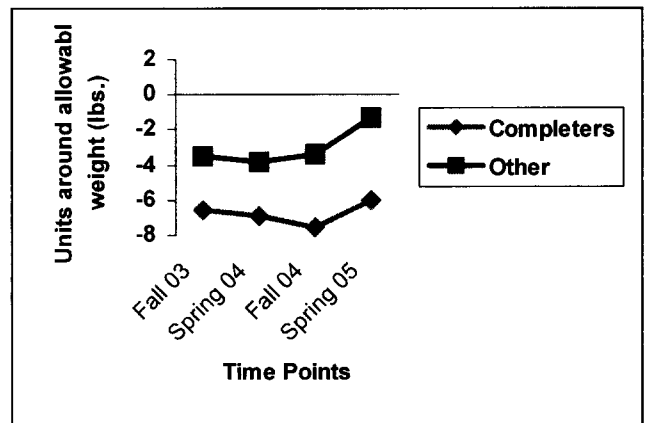


Fig. 2: Male weight deviation change (lbs.) over 2 yrs. around max allowable weight



Note: "0" denotes maximum allowable weight

Fig. 3: Female weight change (lbs.) over 2 yrs.

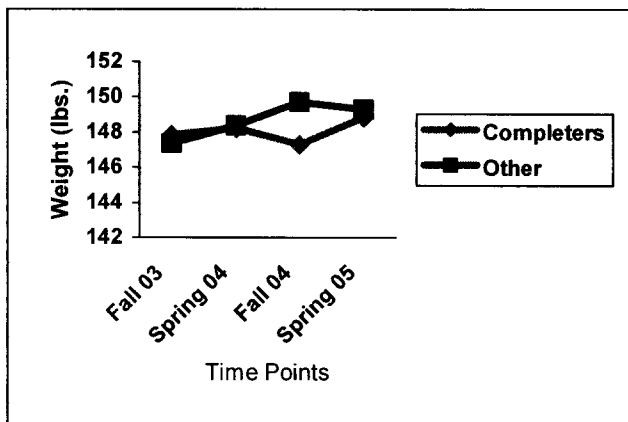
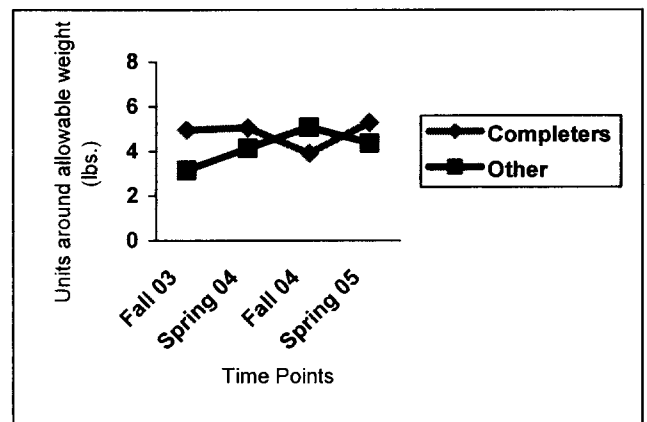


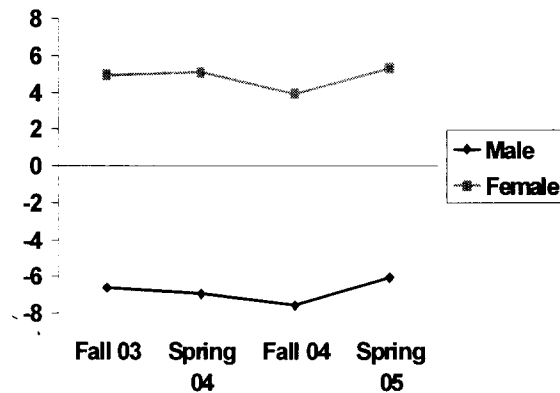
Fig. 4: Female weight deviation change (lbs.) over 2 yrs. around max allowable weight



Note: "0" denotes maximum allowable weight

Figure 5 shows male Soldiers' weight deviations in pounds (represented by black diamonds) and female Soldiers' weight deviations (represented by red squares) plotted together around a zero line, which represents maximum allowable weight. Over time, male Soldiers on average display weights lower than their allowable weights, while female Soldiers on average display higher than their allowable weights (see Figure 1).

Fig. 5: Completers' weight deviation (in pounds) change over 2 years.



### Conclusions:

Development of the H.E.A.L.T.H. website is nearing completion. Beta one testing was conducted and guided modifications of the site to further meet Soldiers' needs. A military population will be involved in beta two testing, which will allow for further enhancement of the site. Pilot testing is scheduled with a larger military population to prepare the site for implementation in January 2006.

The MSFD/FusionNet collaboration is anticipated to yield further iterations of data for analysis. Data collection has begun and will continue until May 2007. Anonymous body fat (AWCP) and APFT data from Soldiers at Ft. Bragg will be evaluated before implementation of the environmental/internet-based intervention (baseline). Three baseline assessments will be conducted with the Soldiers at Ft. Bragg prior to implementation of the intervention. Each assessment occurs when Soldiers complete their height/weight measurements (AWCP) and APFT (see Figure 6, below for timeline). Following the baseline measurements, the environmental/internet-based intervention will be implemented.

Figure 6. Timeline

<u>Measurement Periods</u>						
<u>Baseline 1</u>	<u>Baseline 2</u>	<u>Baseline 3</u>	<u>Time 1</u>	<u>Time 2</u>	<u>Time 3</u>	<u>Time 4</u>
Oct. 2004	May 2005	Oct. 2005	Apr. 2006	Oct. 2006	Apr. 2007	Oct. 2007

Data collection will continue for two years after implementation to test the efficacy of the intervention. The dependent or outcome variables are: 1) the proportion of Soldiers who fail to meet Army standards for AWCP, defined by AR 600-9, and APFT, defined by FM 21-20, 2) satisfaction with the website, and 3) website utilization. Appendix A includes the variables that will be used to evaluate the primary outcome or dependent variable (i.e., the proportion of Soldiers who fail to meet body fat and fitness standards). FusionNet personnel will extract these anonymous data from FusionNet and send them to the PBRC research team. Satisfaction with the website will be evaluated anonymously when Soldiers voluntarily complete the online satisfaction survey, included in Appendix B. Finally, utilization of the website will be evaluated anonymously by analyzing the variables listed in Appendix C, which measure the amount of use of the website. Data from the study will be analyzed using conventional statistics.

## References

American College of Sports Medicine (2000). *American College of Sports Medicine (ACSM) Guidelines for Exercise Testing and Prescription, 6th Ed.* Franklin, B.A., Whaley, M., Howley, E.T. (Eds.). Baltimore, MD and Philadelphia PA: Lippincott Williams & Wilkins.

Department of Defense Instruction 1308.3 (2002). *DoD Physical Fitness and Body Fat Programs Procedures.* Washington, DC: Government Printing Office.

Institute of Medicine (2003). *Weight Management: State of the Science and Opportunities for Military Programs.* Washington, DC: National Academy Press.

U.S. Department of the Army (1987). *The Army Weight Control Program* (Army Regulation 600-9). Washington, DC: Government Printing Office.

U.S. Department of the Army (1992). *Physical Fitness Training* (Army Field Manual 21-20). Washington, DC: Government Printing Office.

**Appendix A**  
**Limited Dataset to Evaluate Soldiers' Fatness, Fitness, and Ability to Meet AWCP and APFT Standards**

FusionNet personnel, who are military personnel, will extract the following variables from FusionNet and send them to the PBRC research team. All data will be electronic and anonymous; the PBRC researchers will not be able to identify, directly or indirectly, individual Soldiers.

**Participant Number.** The Participant Number is generated by performing a Secure Hash Algorithm (SHA-1) on the Soldier's Social Security Number. Each Participant Number is unique to each Soldier but impossible to decrypt to learn the identity of that soldier (the Soldiers cannot be identified, directly or indirectly). The researchers at PBRC will never have access to Social Security Numbers or names of Soldiers.

Age

Race

Grade/Rank

Deployment: Has the Soldier been deployed in the past one year?

Date of APFT

Height

Body weight

Percent body fat (if measured)

Percent body fat Pass/Fail

APFT scores:

Push-ups Score and number of repetitions in two minutes

Sit-ups Score and number of repetitions in two minutes

Run Score and time for the two-mile event

Alternate Event Score (if applicable)

800 yard swim

6.2 mile stationary bike

6.2 mile real bike

2.5 mile walk

Total APFT Score

APFT Pass/Fail

**Appendix B**  
**Anonymous Online Satisfaction Survey**

**H.E.A.L.T.H. Post- Interaction Survey**

Please take a moment to answer the following questions regarding your use of the H.E.A.L.T.H. website. Your feedback is greatly appreciated and very important to us. Your responses are anonymous and will be used to improve the website and to research website utilization.

Regarding your last use of the web site, please place a mark next to the number that best describes how strongly you agree with the statements below.

Overall Assessment of the site

1) The web site was easy to use ("user- friendly").

1      2      3      4      5      6      7  
Strongly agree                      Strongly disagree

2) The web site was personalized. It provided customized feedback to me.

1      2      3      4      5      6      7  
Strongly agree                      Strongly disagree

3) The web site was useful and helped me in my attempts to improve my health.

1      2      3      4      5      6      7  
Strongly agree                      Strongly disagree

For the following questions, please place a mark next to the number or response that best describes how you felt when interacting with the H.E.A.L.T.H. web site.

Feelings about interacting with the web site

4) I felt confused while using the web site.

1      2      3      4      5      6      7  
Never                                      Always

5) I felt lost while looking for information.

1      2      3      4      5      6      7  
Never                                      Always

6) Using the graphics on the website helped me track my progress at changing my habits.

1      2      3      4      5      6      7  
Never                                      Always

7) Did you create an account on the website? Yes No. If yes, was creating an account helpful?

1      2      3      4      5      6      7  
Never                                      Always

16) I have visited the web site \_\_\_\_\_ times (type in actual number)

17) What is the highest grade or year of school you completed?

- a) Some high school
- b) Grade 12 or GED (high school graduate)
- c) Some college or graduated from technical school
- d) College graduate
- e) Post graduate or professional degree
- f) Don't know

18) Please indicate the year in which you were born:

Year: 19\_\_ \_\_.

Please provide any additional comments at this time, particularly related to elements you feel could be added to the website to make it more useful for you and your personal goals!

Thank you for your time!

## **Appendix C**

### **Evaluation of H.E.A.L.T.H. Website Utilization**

The following anonymous data will be collected to evaluate utilization of the H.E.A.L.T.H. website.

**1. Number of Sessions and Internet Protocol Address Number.**

A session occurs each time that the website is accessed and provides a measure of website utilization. The Internet Protocol Address Number cannot be used to identify a website user, either directly or indirectly, but recording of the Internet Protocol Address Number is necessary in order to record the number of sessions.

**2. Session Duration.**

Session duration is defined as the amount of time that the website was accessed during any single session.

## Appendix D Examples of Website Pages

### HOME PAGE

The screenshot shows the homepage of the Fort Bragg H.E.A.L.T.H. website. At the top is a banner image of soldiers in camouflage uniforms. Below the banner is a navigation menu with links: HEALTH TOPICS, NUTRITION, PHYSICAL FITNESS, SPORTS & LEISURE, ABOUT US, SAFETY INFO, and FAQs. On the left side, there is a sidebar with several sections: MEMBERS AREA (Welcome soldier, LOG-OUT), SEARCH (with a search bar and Go button), PERSONALIZED PLAN (Use this to store your information and to get personalized feedback), LIFESTYLE MODIFICATION (Learn how to modify your lifestyle to achieve your nutritional and fitness goals), and HEALTH TOPICS (Check out the latest featured health topic). Below these is a 'Welcome to H.E.A.L.T.H.' section with a circular logo and the text 'Current Health Topic:'. The main content area features a large 'WELCOME' heading, a circular logo with the text 'HEALTH READINESS', and a central text box that reads: 'START HERE TO DETERMINE IF YOU MEET U.S. ARMY REGULATIONS FOR PERFORMANCE AND COMBAT READINESS. WE WILL TAKE YOU THROUGH A SERIES OF QUESTIONS TO DETERMINE YOUR NEEDS TO CUSTOMIZE A FITNESS AND NUTRITION PLAN JUST FOR YOU'. Below this text box is a question: 'At your last APFT, were your measurements (e.g. abdomen, neck, wrist, hips) taken with a tape measure?'. At the bottom of the page is a footer with links: home | about us | health topics | nutrition | physical fitness | sports & leisure | safety info | faqs.

**HEALTH READINESS**

HEALTH TOPICS | NUTRITION | PHYSICAL FITNESS | SPORTS & LEISURE | ABOUT US | SAFETY INFO | FAQs

**MEMBERS AREA**  
Welcome soldier  
• LOG-OUT

**SEARCH**  
Go

**PERSONALIZED PLAN**  
Use this to store your information and to get personalized feedback

**LIFESTYLE MODIFICATION**  
Learn how to modify your lifestyle to achieve your nutritional and fitness goals

**HEALTH TOPICS**  
Check out the latest featured health topic

Welcome to H.E.A.L.T.H.  
Current Health Topic:

**WELCOME**

**HEALTH READINESS**



START HERE TO DETERMINE IF YOU MEET U.S. ARMY REGULATIONS FOR PERFORMANCE AND COMBAT READINESS. WE WILL TAKE YOU THROUGH A SERIES OF QUESTIONS TO DETERMINE YOUR NEEDS TO CUSTOMIZE A FITNESS AND NUTRITION PLAN JUST FOR YOU

At your last APFT, were your measurements (e.g. abdomen, neck, wrist, hips) taken with a tape measure?

home | about us | health topics | nutrition | physical fitness | sports & leisure | safety info | faqs

## Appendix D (continued)

### RECOMMENDED WEIGHT CALCULATOR

[HEALTH TOPICS](#)
[NUTRITION](#)
[PHYSICAL FITNESS](#)
[SPORTS & LEISURE](#)
[ABOUT US](#)
[SAFETY INFO](#)
[FAQS](#)

**MEMBERS AREA**

Welcome soldier

[LOG OUT](#)

---

**PERSONALIZED PLANNER**

---

**SEARCH**

HOME

HEIGHT/WEIGHT CALCULATOR

FAQS

1 2 3 4 5

**RECOMMENDED WEIGHT & BODY FAT CALCULATOR**

This calculator will determine whether or not your current weight and/or body fat percentage falls within the acceptable range according to Army standards (AR 600-9). Please enter the information requested below, then click "submit".

On this site "Maximum recommended weight" is defined as 5% below Screening weight.

*Number of exercise sessions you do per week:	<input type="text" value="2-4"/>	
*Weight:	<input type="text" value="140"/>	lbs.
*Height:	<input type="text" value="67.00"/>	(to increase 0.25 inch)
*Age:	<input type="text" value="28"/>	
*Gender:	<input type="text" value="Female"/>	

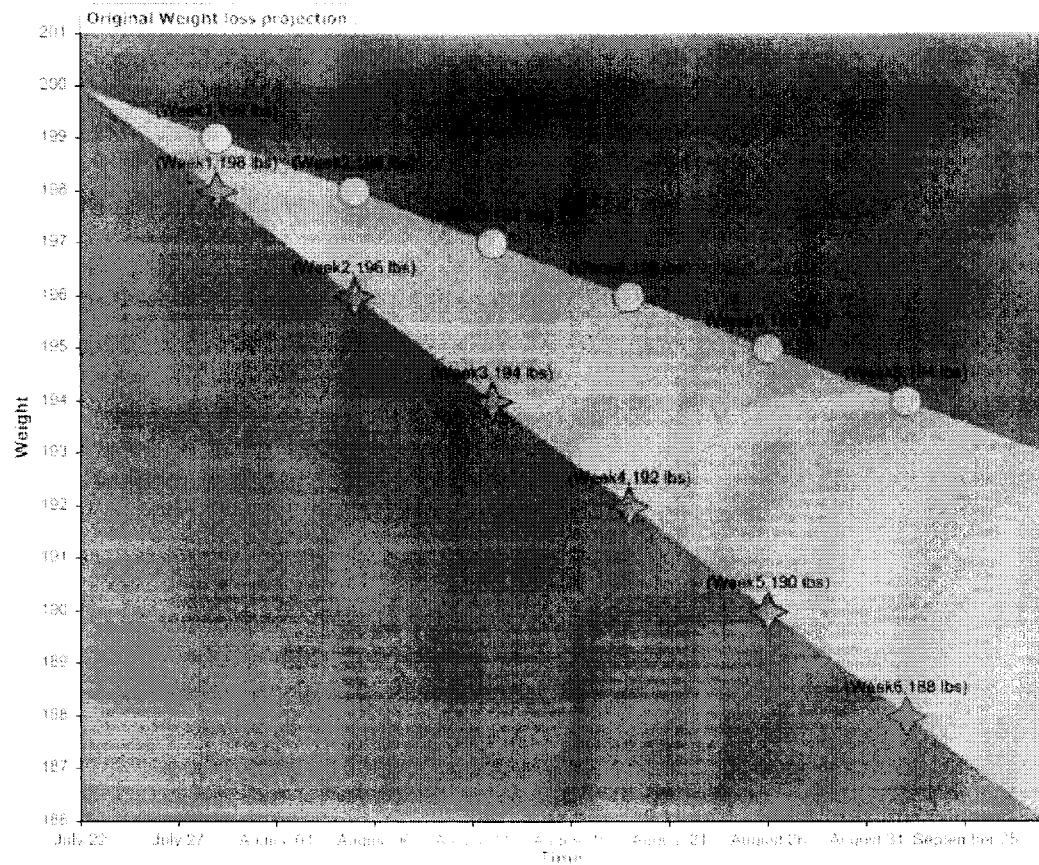
\*[Click here](#) if you need assistance with your measurements.  
 \*[Click here](#) if you don't want to enter your measurements.

*Neck Measurement:	<input type="text" value="15.00"/>	(nearest to 0.25 inch)
*Hips Measurement:	<input type="text" value="40.00"/>	(nearest to 0.25 inch)
*Forearm Measurement:	<input type="text" value="14.00"/>	(nearest to 0.25 inch)
*Wrist Measurement:	<input type="text" value="14.00"/>	(nearest to 0.25 inch)

[home](#) | [about us](#) | [health topics](#) | [nutrition](#) | [physical fitness](#) | [sports & leisure](#) | [safety info](#) | [faq's](#)



Appendix D (continued)  
WEIGHT GRAPHS

Original Weight loss projection




## Appendix D (continued)

### ENERGY BALANCE PAGE



[HEALTH TOPICS](#) | [NUTRITION](#) | [PHYSICAL FITNESS](#) | [SPORTS & LEISURE](#) | [ABOUT US](#) | [SAFETY INFO](#) | [FAQS](#)

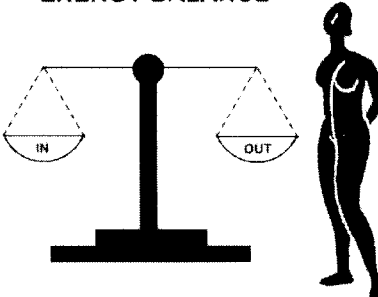
**MEMBERS AREA**  
Welcome soldier  
• [Log Out](#)  
PERSONALIZED PLANNER  
SEARCH

 **ENERGY BALANCE**

### WEIGHT MAINTENANCE

The key to weight management is energy balance. Energy, whether it's in food or being burned by your body, is measured in calories.


### ENERGY BALANCE



If your consumption and use of calories are the same, your weight stays the same.

Maintaining your weight is best achieved through a combination of a healthy diet and regular physical activity. Various factors affect this balance:

- If you can't exercise due to an injury or job assignment, you have to take in fewer calories to avoid gaining weight.
- Conversely, if you are exercising more, your calorie intake can increase as well.
- As you age, your balance of food intake and exercise will need to be adjusted to avoid weight gain.



[home](#) | [about us](#) | [health topics](#) | [nutrition](#) | [physical fitness](#) | [sports & leisure](#) | [safety info](#) | [faq's](#)

**Appendix D (continued)**  
**PHYSICAL FITNESS CALENDAR**

 PRINT

Sun	Mon	Tue	Wed	Thu	Fri	Sat
24	25	26	27	28	29	30
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18 Cardio	19 Chest Sun <input type="checkbox"/> Go Shoulder Sun <input type="checkbox"/> Go Back Sun <input type="checkbox"/> Go Biceps Sun <input type="checkbox"/> Go Triceps Sun <input type="checkbox"/> Go Cardio	20 Legs Sun <input type="checkbox"/> Go Core Sun <input type="checkbox"/> Go Cardio	21
22	23 Chest Sun <input type="checkbox"/> Go Shoulder Sun <input type="checkbox"/> Go Back Sun <input type="checkbox"/> Go Biceps Sun <input type="checkbox"/> Go Triceps Sun <input type="checkbox"/> Go Cardio	24 Legs Sun <input type="checkbox"/> Go Core Sun <input type="checkbox"/> Go Cardio	25 Cardio	26 Chest Sun <input type="checkbox"/> Go Shoulder Sun <input type="checkbox"/> Go Back Sun <input type="checkbox"/> Go Biceps Sun <input type="checkbox"/> Go Triceps Sun <input type="checkbox"/> Go Cardio	27 Legs Sun <input type="checkbox"/> Go Core Sun <input type="checkbox"/> Go Cardio	28
29	30 Chest Sun <input type="checkbox"/> Go Shoulder Sun <input type="checkbox"/> Go Back Sun <input type="checkbox"/> Go Biceps Sun <input type="checkbox"/> Go Triceps Sun <input type="checkbox"/> Go Cardio	31 Legs Sun <input type="checkbox"/> Go Core Sun <input type="checkbox"/> Go Cardio	1 Cardio	2 Chest Sun <input type="checkbox"/> Go Shoulder Sun <input type="checkbox"/> Go Back Sun <input type="checkbox"/> Go Biceps Sun <input type="checkbox"/> Go Triceps Sun <input type="checkbox"/> Go Cardio	3 Legs Sun <input type="checkbox"/> Go Core Sun <input type="checkbox"/> Go Cardio	4

**Appendix D (continued)**  
**PRESCRIPTIONS AND PHOTOS**

[← View Pictures](#)

[← View Descriptions](#)

[← View Pictures & Descriptions](#)

[← PRINT](#)

6/6/2005

## Strength Workouts

Perform the following exercises in the order that has been outlined. Perform each exercise once with a weight that that you can achieve 12 repetitions with. Perform each exercise for a second time increasing the weight by 5% and performing 10 repetitions. Rest periods should consist of 2-3 minutes for multiple joint exercises and 1-2 minutes for single joint exercises in between sets. Follow the directions carefully, and use the photos to guide you in keeping the proper form.

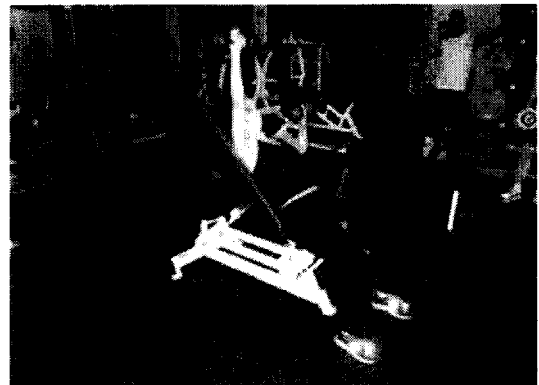
### **Chest Press – Incline 1 Arm Dumbbell**

**Description:**

Lay with your back flat on the incline bench. Grasp a dumbbell with your right hand and raise the weight towards the ceiling. Lower the weight to chest level maintaining stability with the opposite arm. Perform desired reps and repeat with opposite arm.

**Sets:** 8-12 reps

**Benefits:** Strengthening of pectorals muscle group



## Appendix E

### Summary of Travel

6/04	Ft. Bragg, NC	Ray Allen Guy LaVergne	Mtgs. w/ A, B, and DENTAC CO training NCOs regarding the MSFD. Continue work on the DITSCAP plan and SSAA.
7/04	Ft. Bragg, NC	Ray Allen Danielle Bellotte	Mtg. w/ Mr. Dean Spice (IMD). Mtg. w/ Mr. Dan Kaehler of Medpros re: inclusion of MSFD with Medpros. Mtg. w/ SSG Millet of DENTAC re: MSFD Mtg. w/ Dr. Elizabeth Mitchell re: promoting H.E.A.L.T.H. website. Mtg. w/ G6 COL Timothy Kokinda, G3 COL Fredrick Hodges, XVII Airborne Corps G1 (COL Thomas Seamands), and Deputy G1 Mr. Hugh Alderson re: support of MSFD installation base wide.
8/04	Ft. Bragg, NC	Ray Allen Marianna Politzer	Mtg. w/ MAJ Warner and SGT Paris of XVIII Airborne Corps re: FusionNet Mtg. w/ SSG Millet of DENTAC re: MSFD
8/04	Boston, MA	Executive Committee	Executive Committee Meeting – to review progress made to the H.E.A.L.T.H. website and MSFD.
10/04	Ft. Bragg, NC	Ray Allen Danielle Bellotte	Mtg. w/ Dr. Elizabeth Mitchell re: Marketing H.E.A.L.T.H. website and her departure. Correspondence w/ XVIII ABN CORP G-6, re: components of MSFD to be incorporated w/ FusionNet Mtg. w/ SGT Albert Gaskins regarding components of Weigh to Stay that could be included in the H.E.A.L.T.H. website.
11/04	Las Vegas, NV	Executive Committee	Executive Committee Meeting – to review progress made to the H.E.A.L.T.H. website and MSFD.
1/05	Ft. Bragg, NC	Ray Allen Sean Marshall	Mtg. w/ SFC Mark Brooks (A CO), SSG Alfonza Chatfiled (B CO), and SSG Jonathan Millet (DENTAC) re: MSFD update and changes, meet new TNG NCO's. Begin Alpha testing H.E.A.L.T.H. website. Meet w/ ISG(R) Robin Barnes re: marketing website. Brief SGM Heath and CSM Dennis Carey XVIII ABN Corp re: request copies of PT cards for data collection. Mtg. w/ Mr. Dean Spice (IMD) re: continuing support of database downloads. Mtg. w/ MAJ Warner and SGT Paris of XVII ABN re FusionNet updates and MOA. Teleconference w/ PBRC, USARIEM, and NCD re: pilot testing of H.E.A.L.T.H. website.
3/05	Ft. Bragg, NC	Ray Allen Carolyn Brinkley	Interview w/ ISG(R) Robin Barnes re: environmental promotion position. Mtg. w/ MAJ Graff, MAJ Metzger, CPT Walker, CPT Harvill and SGT Gaskins re: discuss the role of NCD in the beta testing of H.E.A.L.T.H. website. Mtg. w/ Dean Spice re: discuss future support of MSFD at WAMC Companies. Mtg. w/ MAJ Warner and SGT Paris XVIII ABN G-6 re: Develop data spreadsheet staff as an alternative collection of baseline and subsequent longitudinal AWCP and APFT data (other than through FusionNet) for validating HEALTH.
5/05	Ft. Bragg, NC	Ray Allen Carolyn Brinkley	Mtg. w/ G6 XVIII Airborne Corps leaders re: FusionNet and data extraction. Mtg. w/ ISG(R) Robin Barnes re: marketing MSFD. April PT.
5/05	PBRC Baton Rouge, LA	Executive Committee	Executive Committee Meeting – to update the Executive Committee of the progress made to the H.E.A.L.T.H. website and the MSFD.